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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/619,521	07/14/2003	Qing Deng	10003809-7	7465

57299 7590 02/26/2007  
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EXAMINER
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VAN ROY, TOD THOMAS

ART UNIT	PAPER NUMBER
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2828

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	02/26/2007	PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

**Office Action Summary**

Application No.

10/619,521

Applicant(s)

DENG ET AL.

Examiner

Tod T. Van Roy

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 28 November 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 47, 48, 50-55 and 57-66 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 47, 48, 53-55 and 60 is/are allowed.
- 6) ☒ Claim(s) 50, 57, 61 and 63 is/are rejected.
- 7) ☒ Claim(s) 51-52, 58-59, 62, 64-68 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                        | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)    | Paper No(s)/Mail Date. _____  |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____   | 6) <input type="checkbox"/> Other: _____                                    |

## **DETAILED ACTION**

### ***Response to Amendment***

The examiner acknowledges the addition of claims 67-68.

### ***Response to Arguments***

Applicant's arguments filed 11/28/2006 have been fully considered but they are not persuasive.

With respect to claims 50, 61, 57, and 63, the applicant has argued that Beam does not teach the substrate/DBR to create strain, or that the buffer layer (#54) is configured to balance any strain present. The examiner respectfully disagrees with the applicant.

On page 8 of the Remarks, the applicant has stated that the substrate/DBR is not creating strain because the GaAs and AlAs materials are lattice matched (para.1). The examiner agrees with the applicant on this point. The strain is not created by a mismatch between the substrate and the DBR, but rather a mismatch between the substrate/DBR and the indium containing active region (Beam, [0036]). Because the GaAs/AlAs material of the substrate/DBR does not lattice match with the InP based active region strain is created. The buffer layer is then created to have a lattice constant that varies across its width (Beam, [0037]) to match the DBR on one side and the active region on the other. This graded lattice constant balances strain that would exist between the substrate/DBR and the active region materials. Without the presence of the buffer layer a lattice mismatch would occur, and undesired strain would be present in

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the device. Therefore, the buffer layer performs the function of balancing the strain that would be present between the substrate/DBR material and the active region material.

As the claimed structural and functional limitations are met by Beam, the examiner believes that the previous rejections would be considered both proper and reasonable to one of ordinary skill in the art.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 50, 61, and 57, and 63 are rejected under 35 U.S.C. 102(e) as being anticipated by Beam et al. (US 2002/0150137).

With respect to claims 50 and 61, Beam discloses a VCSEL comprising: a first mirror stack (fig.2 #52), a second mirror stack (fig.2 #56), a cavity region disposed between the first mirror stack and the second mirror stack (fig.2 #20) and including an active region (fig.2 #26), a defect source (fig.2 #52/12, lattice mismatch starting at substrate continuing through DBR, also, DBR highly doped), a reliability-enhancing layer (REL) (fig.2 #54) positioned with respect to the defect source to reduce defect-induced degradation of one or more VCSEL regions, wherein the reliability-enhancing

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layer is configured to at least in part balance strain created by the defect source ([0037], [0020], the variation of the lattice constant through the buffer layer balances the strain problem that would occur due to the lattice mismatch between the substrate/DBR and the In containing active region, subsequently defects are reduced).

Claims 57 and 63 are rejected as they are methods of forming the layers found to be disclosed by Beam, and are therefor also disclosed by Beam.

#### ***Allowable Subject Matter***

Claims 47, 48, 53, 54, 55, and 60 are allowed.

Claims 51, 52, 62, 65, 58, 59, 64, and 66-68 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

#### ***Conclusion***

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

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the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tod T. Van Roy whose telephone number is (571)272-8447. The examiner can normally be reached on M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Minsun Harvey can be reached on (571)272-1835. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

TVR

  
MINSUN OH HARVEY  
PRIMARY EXAMINER